requirement could be one science museum in each district in the country. There are also organisational questions not only for the management of the museums but also for ensuring coordinati of the museums with the system of education, the Vigyan Mandirs and other community centres, etc. There is also need to prepare suitable layouts of the museums, arrange for the production and supply of exhibits and demonstration models as well as to assess the quantum of inputs necessary to make the scheme viable and efficient.

1.4. In order to consider all these issues, and to assist the Planning Commission in formulating a detailed scheme, the Task Force on Science Museums was set up with the following broad terms ofreference :

i) To advise on the essential details of a Science Museum to be set up at the district and the State Levels;

ii) To suggest a model layout plan indicating the mini space requirements as well as a suitable grouping, sections and exhibits, demonstration models and display materials;

iii) To recommend ways and means of ensuring an effecti role for the science museum in science education and related activities in schools and in the community;

iv) To outline an organisational structure for proper management and administration of the proposed science museums;

and

v) To assess the likely financial costs of setting up the science museums, during the Fifth Plan.

1.5. The composition of the Task Force was as follows :-

1. Prof. C N R Rao, ... Chairman
Convenor, NCST Panel on Science Education,
Indian Institute of Technology,
Kanpur.

2. Prof. Rais Ahmed, ... Member
Professor & Head of the Department of Physics, Aligarh Muslim University,
Aligarh.

3. Shri V P Beri, ... Member
Curator, Central Science Museum,
Birla Institute of Technology &
Science,
Pilani, Rajasthan.

4. Shri A Bose, ... Member
Director of Museums,
Birla Industrial & Technological
Museum,
Gurusaday Road,
Calcutta.

5. Dr. R D Deshpande, ... Member
Joint Secretary,
University Grants Commission,
Bahadur Shah Zafar Marg,
New Delhi.

6. Shri B P Joshi, ... Member
Director,
State Institute of Science
Education,
Udaipur, Rajasthan.

7. Dr. S Nagappa, ... Member
Assistant Educational Adviser,
Ministry of Education &
Social Welfare,
Shastri Bhavan, New Delhi.

8. Shri N K Sanyal, ... Member
Field Adviser, Department of
Science Education, National
Council of Educational
Research & Training,
NIE Campus, Aurobindo Marg,
New Delhi.

9. Dr. K B Shah, ... Member
Director, Community Science Centre,
Navrangpura, Ahmedabad.

10. Prof. B M Udgaonkar, ... Member
Tata Institute of Fundamental
Research,
Homi Bhabha Road,
Colaba,
Bombay - 5.

11. Shri K R Sivaramkrishnan ... Convener
Joint Director (Education),
Planning Commission,
Yojana Bhavan,
New Delhi - 1.

1.6. The Task Force held its first meeting on the 29th May 1973, when it considered the objectives to be achieved and the activities to be promoted in the science museums as well as the number of such museums to be planned, the levels at which these should be organised and an approximate estimate of the financial outlay necessary to implement this programme during the Fifth Plan. In order to work out the details of the proposed museums, a small Group was set up consisting of the following members :-

Shri Amalendu Bose ... Convener
Shri V P Beri
Shri B P Joshi
Dr. K V Sane* and
Shri K R Sivaramakrishnan.

The Group met a Bangalore under the auspices of the Visvesvaraya Industrial & Technological Museum on June 15, 1973; the Chairman of the Task Force was also present. A draft report based on the recommendations of this Group as well as the discussions held at the first meeting of the Task Force was considered and adopted with modifications at the second meeting of the Task Force held at New Delhi on November 8, 1973.

OBJECTIVES AND FUNCTIONS

2.0. The Task Force is of the view that a science museum should be more than an exhibition centre. It should serve as a science centre for the community and also as an educational medium. Through the medium of the Museum, it should promote activities like continuing education and teacher education in regard to science and technology and its application to modern living. It should emphasise such aspects of the society as agriculture, food and nutrition, energy, environment, public health and family planning. There should also be provision for working models, experimental and shop facilities etc. which can be used by children and others.

2.1. The diverse activities and programmes to be covered in these museums would make them function as community science centres on science and technology centres. The word "Museum" used to be linked generally with a collection of antiquated and non-living show pieces; but in the present century, the concept has undergone radical changes and science museums have come to represent dynamic institutions which communicate and display

*Department of Chemistry, University of Delhi, Delhi.

objects to explain the evolution of nature and mankind. We have used the term "Science Museum" throughout this report in keeping with this comprehensive definition.

2.2. The objectives of the science museums should be as follows :

i) To create, inculcate and sustain a general awareness in the public, especially the children about science and its application to modern life;

ii) To develop scientific attitude and temper with a view to helping children and adults to think and act rationally in a modern society;

iii) To supplement science education by providing audiovisual media through science museums, exhibitions, science clubs etc., and by organising teacher education, design and development of teaching aids and experimental kits for students;

iv) To identify, encourage and nurture creative scientific talent, especially among children and

v) To collect, preserve and display the material culture of the people with special reference to India in order that the society inculcates a respect for their culture particularly in the field of science and technology.

2.3. In order that the above objectives are realised effectively, the science museums would have to undertake different functions and activities. In specific terms, these centres should be planned for the following :

i) Arrange for permanent and semi-permanent display of visual objects and exhibits on scientific and technical topics;

ii) Design and produce exhibits, models and other visual objects needed not only for these centres but also by schools and community centres and advise the latter in the display and presentation of these objects according to their thematic and related patterns;

iii) Procure films on science and technology and organise their show to supplement science education in schools and colleges;

iv) Innovate and improvise, through students, teachers and others, new forms of experiments and teaching methods, using commonly available local materials and appliances as well as organise their demonstration periodically with explanatory lectures;

v) Organise hobby centres, science clubs, experimental groups, students' seminars, science fairs and popular science lectures;

vi) Arrange for mobile science exhibitions and semi-permanent exhibitions for educating the masses in urban and rural areas about the growth of Indian Science and Technology, their application to agriculture, industry etc. and to demonstrate science as a homogenising factor in our society.

vii) To provide common service facilities in the form of science library, reading rooms, and auditorium.

viii) To organise in service training for administrative and scientific personnel on the different aspect of establishing and maintaining science museums; and

ix) To carry on research in the history of science and technology with special reference to India.

2.4. Within this broad framework of functions and activities the individual science museums should strive to portray science and technology as in directly relevant to local environment so as to help scientific attitude and pattern being assimilated in community life. The Task Force is of the view that all the science museums need not be of the same type nor should they follow a uniform model. There should be a variety of these according to their size, nature and scope; in fact it is not necessary that all these museums reflect only general acience. While the basic character of these museums should be maintained, each centre should become part of the local environment, depicting the special characteristics of the concerned area. For instance, in an agricultural area the museum should specially be agriculture-oriented; even here there should be provision for variations depending upon the primary crops, farming practices, agro-climatic conditions and ancillary activities like poultry, fisheries etc. At some other places, these could reflect health, popular science industrial growth, natural history etc. According to the Task Force, the attempt should be to provide in each of the science museums a basic

core element common to all the centres supplemented by sections relevant to the local conditions.

2.5. The principle of diversity in science museums is relevant in respect of the size of these centres also. There are at present only two large sized museums in the country, viz., Birla Industrial & Technological Museum, Calcutta and Visvesvaraya Industrial & Technological Museum, Bangalore, both of which have been set up by the Council of Scientific & Industrial Research (CSIR), the Central Museum of Birla Institute of Technology and Science at Pilani and a handful of smaller centres like the Community Science Centre, Ahmedabad, Vigyan Mandirs and Museums. The Task Force is of the view that for a country of our size, this is not at all sufficient, both in numbers and types, if science and technology is to be promoted among the masses with the necessary speed and vigour. Our aim should be to set up 2 or 3 more such large sized museums, each one of them being developed ultimately as National centres comparable to similar institutions in scientifically developed countries, say, like the Museum of Science and Industry a t Chicago (USA). In addition, medium sized science museums should be considered for being set up on a regional basis and a large number of smaller ones at the district level. Each of these medium sized and district level, museums should have mobile units so as to cater to the needs of rural areas and small towns.

2.6. The need to ensure a common basic core element in all the proposed science museums was mentioned earlier. This should generally comprise the following fields of science and technology.

i) Physical, Mathematical, Chemical, Engineering and Biological Sciences;

ii) Health science with special reference to social hygiene, preventive medicine and family planning

iii) Agricultural sciences with special reference to modern agricultural technology and practices, soil and water conservation and management, and agricultural engineering;

iv) History of science and its growth in India;

v) Modern science such as atomic energy, computer science etc., and

vi) Application of science and technology to national development.

In the large-sized national museums, provision should be ma additionally for astronomy, planetarium and space science.

2.7. Within these subject fields, there could be sever thematic representations, such as evolution of the subject field, general principles and their experimental verificati application to the growth of industry, agriculture, transpo and communication and other sectors, impact on society etc. The Task Force recommends that the details of display and presentation by the individual science museum should be set depending upon the location of the centre and no guideline should be made applicable uniformly to all the proposed cen As a general principle, it should be useful to keep the dis pattern flexible and arrange to change the presentation of 50 per cent of the exhibits periodically.

NUMBER OF CENTRES TO BE SET UP

3.1. The establishment and development of science muse is a serious task and would need substantial financial resources. It is therefore, necessary that these are planne carefully in respect of their number and size. Notwithstan the unlimited potential which these museums have to release creative talent among the children and to generate the neces thrust to spread of scientific attitude in the society, realistic programme has to be formulated taking into account among other things, the available manpower resources to orga establish and run these museums. The Task Force has given considerable thought to this matter and recommends the follo targets for the Fifth Plan.

i) 2 major science museums, generally on the patt of the two existing Industrial and Technologic Museums with attached Planetarium;

ii) 6 medium-sized regional science museums;

iii) Not more than 20 small museums at the district level;

iv) About 25-30 mobile science museums to be based the medium sized and small district level scien museums;

v) Develop the existing museums and science centre for minimum facilities as proposed for the abov new science museums;

vi) Creation of a central agency for the planning a management of the science museums with arrange- ments for funding special programmes; and

vii) One or more laboratory or production centre for demonstration aids and models.

3.2. As a general guideline, the Task Force would suggest the establishment of the major science museums in cities with a population of over 8 lakhs, the medium-sized one in cities with a population between 3 to 8 lakhs and the rest in places with less than 3 lakhs of population.

3.3. The success and effectiveness of these centres will depend to a considerable extent upon local and community commitment. It is necessary therefore to involve agencies at the local level right from the beginning itself. While the attempt should be to ensure that atleast one science museum is located in each of the States, the exact location should be settled on the basis, inter alia, or the public enterprise and support forthcoming from the community, in the form of free land and its development. There should also be a wide clientels for these centres not merely from the school students, teachers and the elite but also from the general public. It may be noted in this context that the Museum at Bangalore is visited on an average by about 500,000 people annually. As the service offered at these Museum is enriched by their association with scientific institutions like research institutes, proximity to, and professional support from, existing educational or research institutions should be another factor to be taken into account in the location of these centres.

PHYSICAL FACILITIES

4.1. The Science Museums should have provision for educational, experimental and creational facilities in order that they are able to fulfil their objectives. This would mean construction of buildings for a gallery or exhibition hall, an auditorium, lecture rooms, a workshop, laboratories, a library and a hobby centre. In the case of the major museums, a planetarium will be an additional feature. As the major and medium sized ones are going to be planned ultimately to become national museums, a long-term perspective should be prepared comprising district phases of development to be attempted in the Fifth and subsequent plans; while the construction of buildings will follow a phased programme, it is essential that the future requirement of land and space are assessed and acquired in the initial stage itself.

4.2. The layout of the museums should provide for a horrizontal spread and extension of the buildings and for sufficient open space and lawn facilities in their premises. Normally no museum should consist of more than four floors of a building. The Industrial and Technological Museums at Calcutta and Bangalore might be taken as a model on which the major science and technology centre could be patterned. The

Task Force recommends the following minimum requirement of land and built-in area for each of the three types of science museums proposed for the fifth plan :

	Major Museum	Regional Museum	District Museum
1. Land (acres)	10	5	1
2. Area of buildings ('000 Sq.ft.)			
i) display hall, library, auditorium and lecture hall etc.	120	80	20
ii) Workshop and Stores	30	10	@
iii) Planetarium	60	-	-
	210	90	20
3. No. of floors	4	4	1

@ Provision for a maintenance workshop is included in 2(i)

4.3. The Task Force is aware that these space requirements are considerably less than what is provided in some of the science Museums abroad. For instance, in the Museum of Science and Industry, Chicago, even one sector, "Showcase for Steel" occupies 16,000 Sq.Ft. of display space on two floors or those on "Petroleum" and "Seapower" are a 10,000 Sw.Ft. exhibit each. It is however neither possible nor necessary at this stage for us to embark on a large-sized building programme beyond what is proposed in this report.

4.4. As stated earlier, the Task Force is in favour of a flexible approach to the selection of various sections to be organised at the individual museums as also to their lay-out and presentation. Nevertheless the following for enumerated to provide general guidelines;

(i) Display Sections

4.5. The museums could consist of the following sections :-

Space research and achievements
Astronomy
Electronics
Electricity
Machine & Industries
Biology (Models and Specimens)
Chemistry (Metallurgical processes, manufacture of various chemical compounds)
Eminent scientists and their work
Teaching aids in science
Teaching aids in modern mathematics
Improvisation in science
Mining
Communications
Transportation
Health and Hygiene
Polymers, Plastics etc.
Meterology
Planetarium
Agriculture
Medicine

ii) Seminars and Symposia

4.6. Subject exports/eminent scientists may be invited to deliver demonstration lectures/popular talks. The lectures/talks may cover a variety of topics related to recent advancements, work of scientists and other aspects related to 'science in the service of man'.

iii) Screening of films

4.7. Science films relevant to school/college curricula and depicting advancement in various fields may be shown. Model lessons on different topics may also be displayed through films for the benefit of teachers as well as students.

iv) Laboratories

4.8. The Laboratories should be kept open for all types of students who want to undertake some experimental projects. The laboratories should be able to provide all facilities to the talented students so that they may be enabled to pursue their ideas/projects.

v) Workshops

4.9. Workshop may be planned in such a manner that it may develop good working as well as static models to depict

various principles of science. The teaching aids may also be developed by teachers, during their training programmes, suited to the syllabi and teaching needs. It is envisaged that worksho will be equipped with well qualified staff, machines capable of doing all types of work such as metal work, wood work, smithy, welding, polishing etc., The workshop should also be able to repair all types of instruments in the museum.

vi) Mobile Exhibition Unit

4.10. The Mobile exhibition unit may take up the work of popularising science in rural as well as urban areas by displaying exhibits at important towns and Panchayat headquarters. Along with it, some demonstration lectures and popular talks may also be arranged. The exhibition may consist of some working models depicting scientific principles, charts, static models, biological specimens etc.

vii) Scientific toys and working models

4.11. Scientific toys and working models have both an educational and a creative value to young students. It would be useful to set up a separate wing to develop a children's section including a variety of scientific toys based on scientific and technological principles and using modern aids and gadgets. The building of toys could lead to inspiring projects as well, in which best of the talents could be involved. The scientific exhibits and material based on classroom carriculum would be an important educational medium.

O R G A N I S A T I O N

5.1. The Task Force notes that one of the reasons why an earlier scheme for establishment of Vigyan Mandirs did not prove effective is that there was no central infrastructure provided for these institutions. As the science Museums are to function as a part of the community at the local level, they must develop strong links with local forums, such as the Nehru Yuvak Kendras and with Government, and educational authorities at the area level. This is necessary also to ensure that these museums to not operate in isolation but offer to the community an integrated service in respect of all aspects of science and technology. They should interact with agencies engaged in curriculum development, text book writing and other educational activities; it is important that these museums collaborate with the UNICEF assisted projects for the improvement of science teaching in schools.

5.2. The science Museums would also benefit considerably by their association with academic, scientific and professional

organisations. While the planning and organisation of these museums should be done in a coordinated and centralised manner, each of these should establish effective links with the appropriate agencies in its neighbourhood. For this purpose, the Task Force recommends that each museum be developed as an autonomous institution and that an advisory committee be set up for each of them, including representation from the several interests concerning science and technology.

5.3. For the planning of the network of science museums, there should be a separate executive agency for science museums with the required specialisation and expertise and a National Advisory Committee of representatives from all the concerned agencies and organisations to advise the former on the major aspects of policies and programmes. The central agency will ensure effective coordination of activities of the individual science museums and pool the available resources in order to prevent infructuous expenditure on experimentation, designing and fabrication of models etc. In the initial stages, it would be necessary for this agency to arrange for the shifting and transfer of models, exhibits and personnel from one museum to the others. Moreover, each of the science museums would be able to act as a focus from which guidance, experience and expertise will radiate to towns and villages in its neighbourhood. This process of dissemination of services of the science museums should be planned and facilitied; this would be another major responsibility of the proposed central agency. There is also need to provide for scientific evaluation of the Museums from time to time with a view to improving their effectiveness and the quality of their services. The Task Force recommends that the individual museums develop as autonomous institutions and yet are able, through well defined linkages with the central agency, to optimise the limited resources available for the purpose.

5.4. Until such time as this authority is set up, the Task Force recommends that the Directorate of Museums of the CSIR, which has already organised the Industrial & Technological Museums at Calcutta and Bangalore, could be requested to undertake the preliminary action for the new science museums proposed in the Fifth Plan.

5.5. The Task Force also recommends centralised facilities including a laboratory to design, develop and prepare prototypes of models and exhibits. Such facilities could be organised in one on the science museums rather than a separate unit so that apart from economy in costs, the products of this unit are in harmony with the diverse requirements of the network of science museums at different levels.

5.6. The Task Force reiterates its view that the success of the science museums will depend very much upon the effective

linkages they are able to forge with the community organi and the professional academic and scientific agencies in neighbourhood. Apart from giving technical guidance to t centres, the agencies like research laboratories, Univers departments of science and colleges would help in the bui up of demonstration models and the preparation of displa rials; they could also supply as gift some of the pilot p developed by them. Keeping this in view, it is recommend wherver possible, the science museums should be set up in proximity to, if not as part of, existing insitutions li schools, colleges or research institutions.

5.7. The Task Force was given to understand that the Ministry of Education and Social Welfare have under consi proposal to set up community schools during the Fifth Pla these schools are, inter alia, to act as extension centre carry the message of science to the surrounding populatio for that purpose, a science museum and mobile science lab are to be attached to each of these community school. If proposal is ultimately approved as envisaged, some of thes community schools could be considered for the location of district level science museums recommended in the report. In such a case, the national executive authority, recomme earlier, should, jointly with the concerned State Governme agencies, formulate a plan for the science museums to be s in the community schools.

5.8. Similarly, it should be possible to make of some the existing centres like Vigyan Mandirs, community Scienc Centres and Science Museums to provide the nucleus around the proposed activities could be organised.

FINANCIAL ESTIMATES

6.1. In order to realise physical targets proposed in report, it would be necessary to provide for an outlay of Rs. 11.3 crores for capital works and an annual recurring expenditure of Rs. 17lakhs ; the latter includes the cost o making exhibits and other display materials by the propose centres themselves which would yield a capital asset of ab Rs. 3 lakhs being the value of the models made. These esti are based on the experience of the CSIR for their Industri & Technological Museums as well as of the Community Science Centre at Udaipur and the Central Museum at Pilani. These indicated here only to give a financial dimension of the in required for the scheme and are to be firmed up for each o proposed centre as and when detailed plans are formulated.

6.2. The Task Force realises that it will not be feasi to complete the establishment of all the science museums wi

a period of 5 years; more so when we have to start from the beginning so far as this programme is concerned. It would only be realistic to assume a phased programme of work, especially in construction, for all these centres during the Fifth Plan. Similarly, it is not necessary to provide for recurring expenditure at the fully operational level, which would be reached only by 1980-81. Keeping this in view, the Task Force recommends a provision of about Rs. 15 crores to be made for the development of science museums during the Fifth Plan. The break up of this outlay by programmes, is shown below :-

(Rs. in lakhs)

Sl. No.	Programme	Cost per Centre		Fifth Plan		Total
		Capital	Revenue per year	Capital	Revenue for 5 years	
1.	National Science Museums					
	i) Establishment of two new Museums	130.0	9.0	200.0	50.0	250.0
	ii) Development of the existing museums at Calcutta & Bangalore	-	-	100.0	50.0	150.0
2.	Regional Museum					
	Establishment of 6 new museums	50.0	5.0	250.0	90.0	340.0
3.	District Museum					
	Establishment of 20 new museums	18.0	3.0	300.0	140.0	440.0
4.	Mobile Science Education Units	1.0	1.5	30.0	30.0	60.0
5.	Development of existing community science centre/ science museums	-	-	50.0	50.0	100.0
6.	Training of manpower for the proposed centres	-	-	-	25.0	25.0

(Rs. in lakhs)

Sl. No.	Programme	Cost per Centre		Fifth Plan		To
		Capital	Revenue per year	Capital	Revenue for 5 years	
7.(i)	Setting up of a central organisation for planing and coordination including provision for central design of museums, exhibits, models etc.	-	-	-	25.0	2
(ii)	Special exhibitions such as industrial site museums et:	-	-	-	50.0	5
8.	Cost of land and its development (National)	-	-	60.0	-	6
	Total	-	-	990.0	510.0	150

6.3. The Task Force recommends that the entire financial responsibility of Rs. 5 crores for the district level science museums and the mobile science education units should be taken over by the Ministry of Education and/or the State Education Departments. In view of the fact that the establishment of science museums on an extended scale is a new activity, the success of which would depend upon a coordinated approach and direction, it is also recommended that the scheme should be treated as centrally sponsored with cent per cent central assistance during the Fifth Plan. Technical guidance for the setting up of these centres would be made available by the proposed national authority in the Department of Science & Technology. The latter would also provide in their plan the outlay of Rs. 10 crores required for the other programmes suggested in this report.

MAN POWER REQUIREMENTS

7.1. If the physical targets proposed in this report are accepted in full, it would create employment opportunities for about 1175 scientific and technical personnel as shown below

ogrammes	No. of units	Employment			
		Scientific	Tech-nical	Admi-nistra-tive	Total
itional Museums	2	60	160	60	280
gional Museums	6	90	180	108	378
istrict Museums	20	160	360	180	700
obile Units	30	30	60	30	120
thers		25	50	25	100
		365	810	403	1578

.2. Of the scientists, more than 800 would require specialised raining in museology and museum planning and administration; his should be taken up as an advance action before the programmes are implemented. Similarly the technical staff would require a well formulated apprenticeship in some of the existing science centres/museums. In addition, steps should be taken to train a cadre of science museum guides not only to explain the different exhibits etc. to the public at large but also to help students and teachers to coordinate their visit to the museum with education in their schools.

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ANNEXURE 'B'

Report of the Committee constituted for suggesting a Plan of Implementation of the Report of the Task Force on Science Museums

The feasibility of the recommendations of the Task Force on Science Museums and the opinions expressed therein have been examined with a view of their implementation. In view of the severe constraint on financial inputs in the Fifth Plan it is realised that the recommendations cannot be fully implemented in the current plan although the role of Science Museums has been proved and their impact on social, economic and educational sphere is wellknown. A suitable plan of implementation is suggested below :

Science Museums of a National Level

The Committee's recommendations for establishing two new science museums on a National Level in addition to the two already existing large size museums viz. BITM, Calcutta and VITM, Bangalore needs immediate implementation, since such museums will ultimately help in setting up district science museums and regional science museums in India.

One of the new science museums on a National Level could be located at Bombay where land for this purpose has already been allotted to CSIR. Moreover there is a possibility of pooling the resources of CSIR with a private society known as Nehru Centre which has been constituted for establishing a centre of Art, Culture, Science & Technology. There is also a possibility of funds being available from ICOM Paris and PL - 480 for jointly setting up a centre for Design of Science Museum exhibits, production of proto-types and training of science museum personnel from India and from developing countries.

A second suitable location would be in New Delhi where there is a possibility of getting a suitable site through the joint efforts of Ministry of W.H. & S., Delhi Development Authority and CSIR. CSIR has a number of institutes in New Delhi where it might be possible to set up an interim centre where a number of activities could be undertaken, exhibits can be collected and fabricated, temporary exhibition could be arranged. At an appropriate time when land is selected and a suitable building is constructed, the centre could be shifted. In case efforts in locating land in a central area in Delhi does not prove successful attention will be directed to Madras where the State Government has already set up a planning unit for a Science Museum.

The existing CSIR museums at Calcutta and Bangalore

need to be strengthened so that they build up a capacity to supply new models to newly set up museums, to train museum and to plan other museums in the country. The BITM, Calcut has already taken advance action for designing a new buildi house new galleries on Coal Mining, Energy, Environment and infrastructural facilities for holding R & D Exhibitions, a supplying new models. Efforts are being made by them to collaborate with Coal Mine Authority and other CSIR institu The VITM, Bangalore has already taken steps to augment thei infrastructure with improved workshop facilities and add galleries on Atomic Energy, Electric Power Generation etc. are now of tremendous national significance. There is also proposal for adding facilities for exhibition of R & D achi and holding seminar, symposia and scientific lectures in th museum.

Regional Museum

The Task Force have recommended that 6 medium size science museums be set up on regional basis, and mobile sci exhibition units may operate from such areas. One such sui place for locating a regional museum appears to be at Gauha Assam from where the various hill States in North East Indi can be reached through Mobile Exhibition Units. At present areas are not receiving adequate attention in the field of education. It also appears that the Assam Science Society already approached the Assam Govt. offering to set up a Sci Museum in Gauhati provided funds are made available. This be encouraged.

District Science Museum

To start with 6 district museums can be set up in on regionwise basis e.g. 3 district science museums in soutl India and 3 in the north. Due to financial restraints it m be possible to have one district level science museum in ev district in India as envisaged by the Task Force. Already number of districts have shown considerable interest such a example Coimbatore in Tamil Nadu, Gulbarga in Mysore, Vijay in Andhra, Purulia in West Bengal and Allahabad in U.P. On district science museum in Bihar is also considered importa

For setting up such district level science museums necessary that land should be provided free of cost by the Government. Efforts will be made to locate some buildings this purpose in the town itself or the cost of building wil shared between the State Government and the Centre. The ac models and exhibits will be provided initially by the major science museums but the staff for upkeep of the museum and maintenance will be borne by the State Government. A Commi

consisting the District Magistrate, educationists, Health Officer, Local Experts in the field of science and enthusiastic persons from the Community will be set up to advise the district museum because the science museums cannot work in isolation if it has to make an impact in the Community. Moreover in many districts a number of audio-visual equipments are lying idle and these equipments can be utilised in better manner if there is a coordinating Committee. The district level science museum will cater to the needs of the children, teachers, local industries, agriculturists and the public as a whole. For this it is necessary that besides the museum component there should be scientific, industrial, medical and agricultural film shows. The selection of the films should be such that it will help in developing scientific and technological knowledge. These museums should have a small workshop where children can go after their classes and prepare exhibits which will help them in developing their hobbies in Chemistry, Electronics, Astronomy, Physics, Earth and Life Sciences, and other subjects.

Mobile Science Exhibition Units

As recommended by the Task Force Mobile Science Exhibition Units should be attached to District Level Science Museums and regional museums. As such during the fifth plan, their total number will be restricted to 7 units. Initially the units will be equipped by any of the 4 national level museums.

Development of Existing Science Museums

There are various Community Science Centres and small Science Museums in the country which could develop faster provided some funding and technical expertise are given to them. Examples of such museums are the Children's Museum, Amreli in Gujrat State, the Community Science Centre, Ahmedabad, Children's Museum and Balbhavan at Delhi and Hyderabad etc.

Training of Man Power

Qualified and experienced manpower in the field of science museum is essential for successful implementation of the plan. BITS, Pilani who has started offering degress leading to M.Sc (Tech.) in museum studies, is the only institution of its kind. It will be useful to offer incentives to qualified students to pursue this course so that eventually they may turn out to be good museum professionals. Technicians, engineering graduates and diploma holders could also be offered facilities for practical trining in model making and encouraged to start business of their own.

1	2	3	4	5	6	7
5.	Development of existing community science centre/science museums	-	-	10.0	-	10.0
6.	Training of manpower for the proposed museums	-	-	-	5.0	5.0
				339.0	163.0	502.0

It will thus be seen that a revised capital expenditure of Rs. 339.0 lakhs is envisaged during the 5th plan and a revenue expenditure of Rs. 163.0 lakhs for development of science museum in the country.

Sd/-

A. Bose
Director of Museums,
CSIR

Sd/-

Prof. Rais Ahmed
Director, NCERT

8. Prof. K B Garg,
Physics Department,
University of Rajasthan,
Jaipur. .... On invitation

9. Dr. N R Banerjee,
Director,
National Museum,
Janapath,
New Delhi - 110011. .... On invitation

10. Dr. Saroj Ghose,
Director, NCSM,
19A, Gurusaday Road,
Calcutta - 700 019. .... Member

11. Shri R M Chakraborti,
Senior Curator,
Visvesvaraya Industrial &
Technological Museum,
Kasturba Road,
Bangalore - 560 001. .... Member

12. Shri S K Bagchi,
Senior Curator,
Birla Industrial &
Technological Museum,
19A, Gurusaday Road,
Calcutta - 700 019. .... Member

No communication was receivedfrom Dr. A K N Reddy and Shri Anil Sadgopal. Dr. V G Kulkarni regretted his inabi to attend the meeting due to some preoccupation.

The Chairman at the outset welcomed the members. After a fruitful discussion held on the different aspects of the terms of reference the Study Group recommended the following for the consideration of the Governing Body of NCSM.

A. Conceptual Development

1. Purpose : The District Science Centre will be developed as an activity based learning centre to -

i) develop scientific aptitude and thinking by encouraging curiosity and questioning processes;

ii) encourage critical analysis of social, cultural technological and natural environment;

iii) inculcate an ability to identify the problems and work towards and appropriate solution;

iv) collect and disseminate information relating to science and technology on demand;

v) promote and support innovative and experimental activities in pursuit of the purposes of the centre

2. All District Science Centres should have a common basic core element concentrating on as many of the following subjects :-

a) Method of science incorporating physical, Natural and Social Sciences;

b) Agricultural Sciences with special reference to Agricultural Technology, Soil and Water Conservation and Management, Food, Fodder and Ecology;

c) Energy, Craft and Cottage Industries;

d) Health Sciences with special reference to Social Hygiene, Preventive measures, Family Welfare, Food and Nutrition.

An individual District Science Centre should necessari not strive on all activities as mentioned above. Programmes may be developed based on the available human and other resources and actual needs of the area.

3. Each individual District Science Centre will emphasise on topics of local variation and relevance in addition to the basic core element.

4. The District Science Centre will assume the role of an organiser for various programmes through the involvement of the local people and relevant agencies.

B. Infra-structure

I) Staff requirements

The following staff are recommended for the Central Planning Unit located in NCSM Headquarters in order to plan, support and monitor the activities in various District Science Centres.

Curator Gr. I (1100-1600)	- 1 post
Curator Gr. II (700-1300)	- 2 posts
Sr. Scientific Assistant (550-900)	- 2 posts
Exhibition Officer (700-1300)	- 1 post
Jr. Stenographer (330-560)	- 1 post

The Study Group noted that out of the above require

one post each of Curator Gr. I, Curator Gr. II, Senior Scientific Assistant and Exhibition Officer have already bee created by the NCSM.

The following size of the staff is recommended for ea individual District Science Centre when fully developed.

*Curator Gr. II (Rs. 700-1300)	- 1 post
Sr. Scientific/Exhibition Assistant (Rs. 550-900)	- 2 posts
Jr. Accountant (Rs. 425-760)	- 1 post
Jr. Stenographer (Rs. 330-560)	- 1 post
Guide Lecturer regular/trainee	- 2 posts
Technicians	- 5 posts
Artist	- 1 post
Caretaker	- 1 post
Driver (Rs.260-400)	- 1 post
Total :	15 posts

Contractual staff requirement for each District Science Centre :

Watchman	- 6 Nos. (in three shifts)
Sweeper	- 2 Nos.
Mali	- 1 No.

*The Curator Gr.II shall be designated as District Science Officer whenever he will be placed in charge of Dist Science Centre.

The Senior staff to be recruited should have appro- priate background in basic Science/Engineering/Biological Sciences/Agriculture Agronomy/Science Communication and have managerial capability and ability to deal with the people in rural areas. He should have a definite commitment to the cause of the District Science Centre and innovativeness and creative ability in the post.

The NCSM shall introduce traineeship with appropria allowances for different categories of people to be recruite for District Science Centres so that their capabilities and aptitude towards such activities can be assessed before offe regular appointments.

The personnel for District Science Centres must be recruited well in advance and must be provided with a purpose

training in the NCSM units as well as other Centres like VASCESC, Ahmedabad, HBSC, Bombay, BITS, Pilani etc.

The staff pattern in District Science Centre must be conductive to their becoming self reliant in organising activities and programming on their own. The supporting exhibits shall however be supplied from the parent museum/ centre or collaborating agencies.

2. Equipments

Each individual District Science Centre will have essential equipments as required by local needs on the followings :

i) Machine tools for repair and maintenance of exhibits and for running activities :

ii) Electrical and Electronics equipments and instruments for repair and maintenance of exhibits and for running activities;

iii) Art and Craft tools and drawing instruments;

iv) Audio-visual equipments for education;

v) Essential office equipments

vi) Demonstration Van and Moped.

3. Land and Building

The DSC may have provision for expositional, experimental and recreational facilities in order that they are able to fulfil their objectives. This would mean construction of buildings for exhibition hall, lecture rooms, workshop, laboratories, library and activity centre. Considering the above, the following are the minimum requirements for land and building :

i) Land - minimum 3 acres.

ii) Covered area of a maximum of 20,000 sq. ft. to be built in phases.

C. Collaboration :

i) In general the State Governments should have active involvement in the case of each DSC both in terms of giving free land and sharing capital expenditure of about 50% and

by way of recurring grants for various community science programmes.

ii) Involvement of local authorities and expert necessary and on advisory committee be set up for each DS for formulating its programmes.

iii) Linkages have to be developed with relevant institutions engaged in rural upliftment and services experts from such institutions should be availed of.

iv) The NCSM shall explore the possibilities of running the first two District Science Centres exclusively under its own management and the remaining three DSCs which are to be taken up during the 6th plan period under the joint management with the State Government or autonomous societies.

v) The following agencies are identified for collaboration :

a) Vikram A Sarabhai Community Science Centre, Ahmedabad.

b) Kishore Bharati, Hoshangabad.

c) Homi Bhabha Centre for Science Education,

d) Murugappa Chettier Research Centre, Madras

e) Vigyan Shiksha Kendra, Banda.

f) Assam Science Society.

g) Kerala Sastriya Sahitya Parishad.

h) Nehru Yuba Kendra

i) Adult Education, Dept. of Ministry of Educ

j) State Dept. of Youth Services.

k) Rotary Club, Lions Club, etc.

l) Philanthropic & Missionary organisations interested in such activities.

D. Selection of sites :

i) The District Science Centre may as far as practicable be located centrally within the district, properly connected through transport and other media of communication.

ii) District Science Centres at Purulia in W.B. and Gulb in Karnataka should necessarily be accommodated out of 5 centr

isaged for the 6th Plan period.

iii) NCSM may select in consultation with the respective State Govts sites for the remaining 3 centres out of the following five backward regions identified :

a) Kanyakumari or Ramanathapuram or Tinnevelli in Tamil Nadu,

b) Ahmedanagar region in Maharashtra

c) Banaskantha or Sabarkantha or Panchmahal in Gujrat.

d) One district in Nagaland to be selected by the State Govt.

e) Banda or Hamirpur in Bundelkhand area falling as the border between U.P., M.P. and Rajasthan.

Conclusion : It is recommended to set up 5 DSCs including rulia and Gulbarga during the 6th plan period to serve as lot projects for the development of future DSCs. The success DSCs rest almost exclusively on the selection of proper rsonnel at the senior level who shall have to be committed the purpose of such centres. The DSCs shall enjoy adequate tonomy in financial and administrative matters for organising tivities within the stipulated budget.

ANNEXURE 'D'

*Layout Plan of Science Park at DSC, Purulia

*Ground Floor Plan of DSC, Purulia Building

*First Floor Plan of DSC, Purulia Building

*Front view of DSC, Purulia Building

*Side view of DSC, Purulia Building

*Site Plan of DSC, Gulbarga

*Layout Plan of DSC, Gulbarga including Science Park

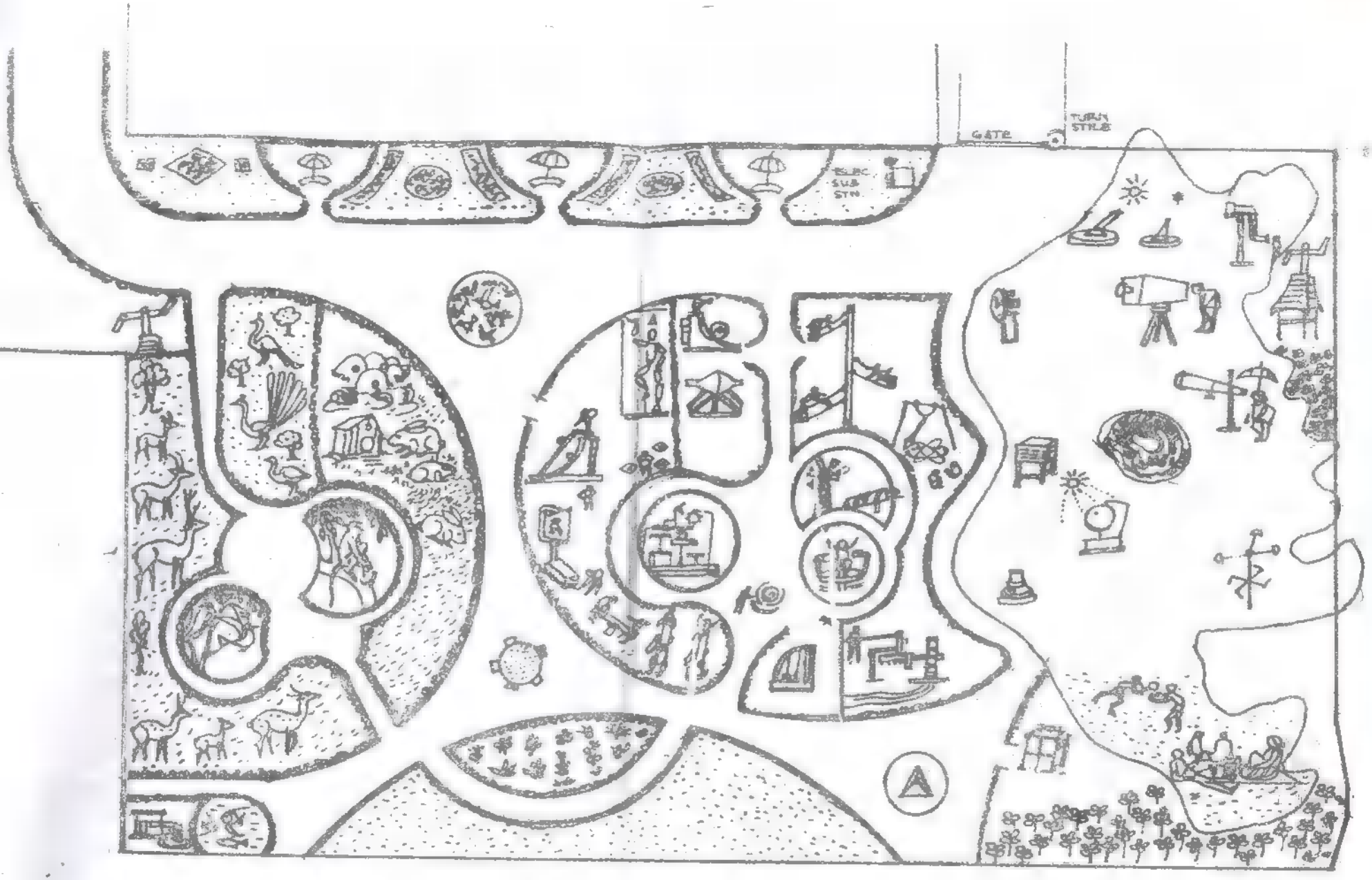
*Layout of DSC, Gulbarga Building

*Basement Plan of DSC, Gulbarga

*Ground Floor Plan of DSC, Gulbarga

*First Floor Plan of DSC, Gulbarga

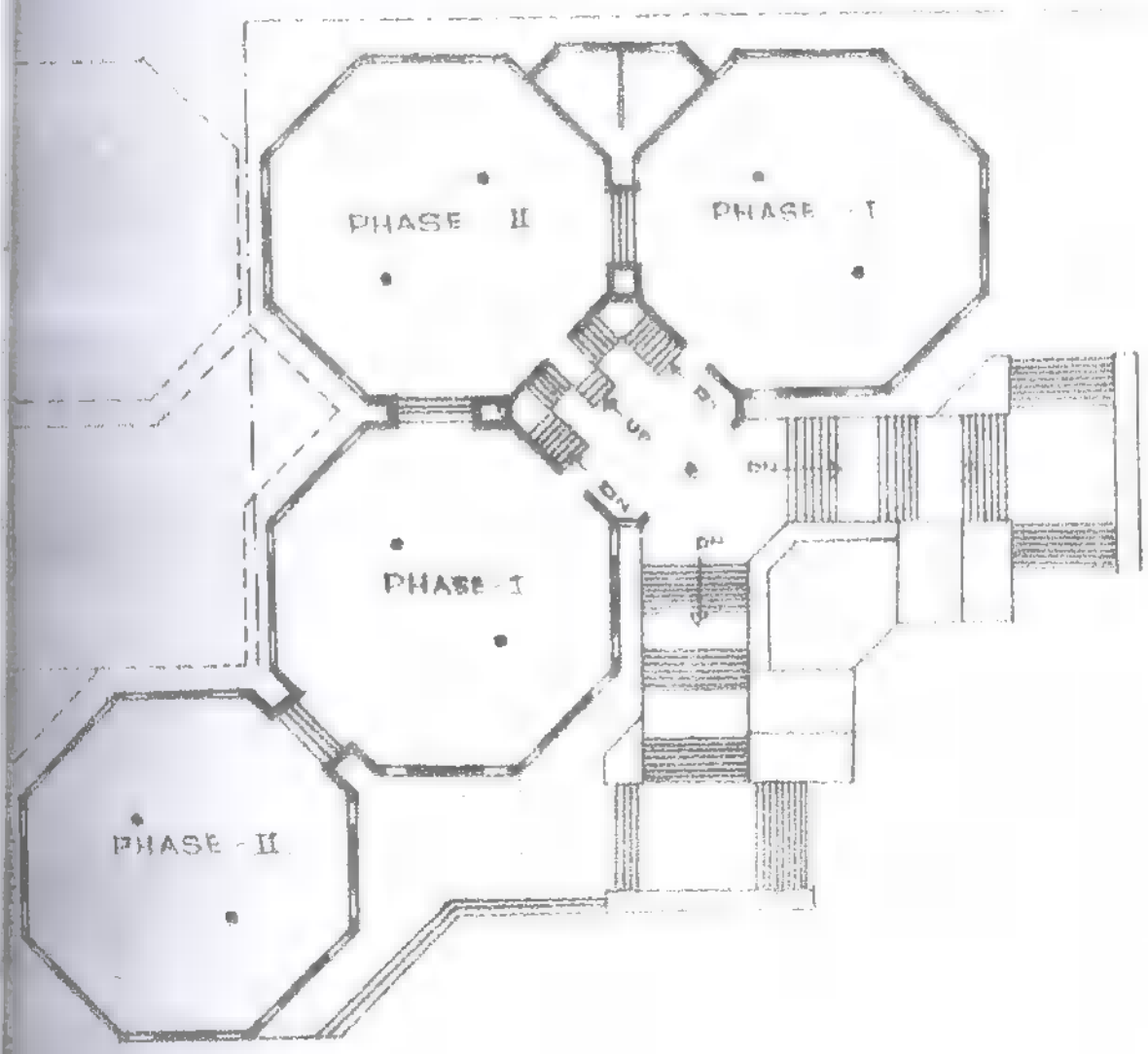
*View of DSC, Gulbarga Building



PROPOSED LAYOUT FOR SCIENCE PARK OF
DISTRICT SCIENCE CENTRE , PURULIA

SCALE — 1:400

DISTRICT SCIENCE CENTRE
PURULIA, WEST BENGAL.
GROUND FLOOR PLAN



SCIENCE PARK

S

N

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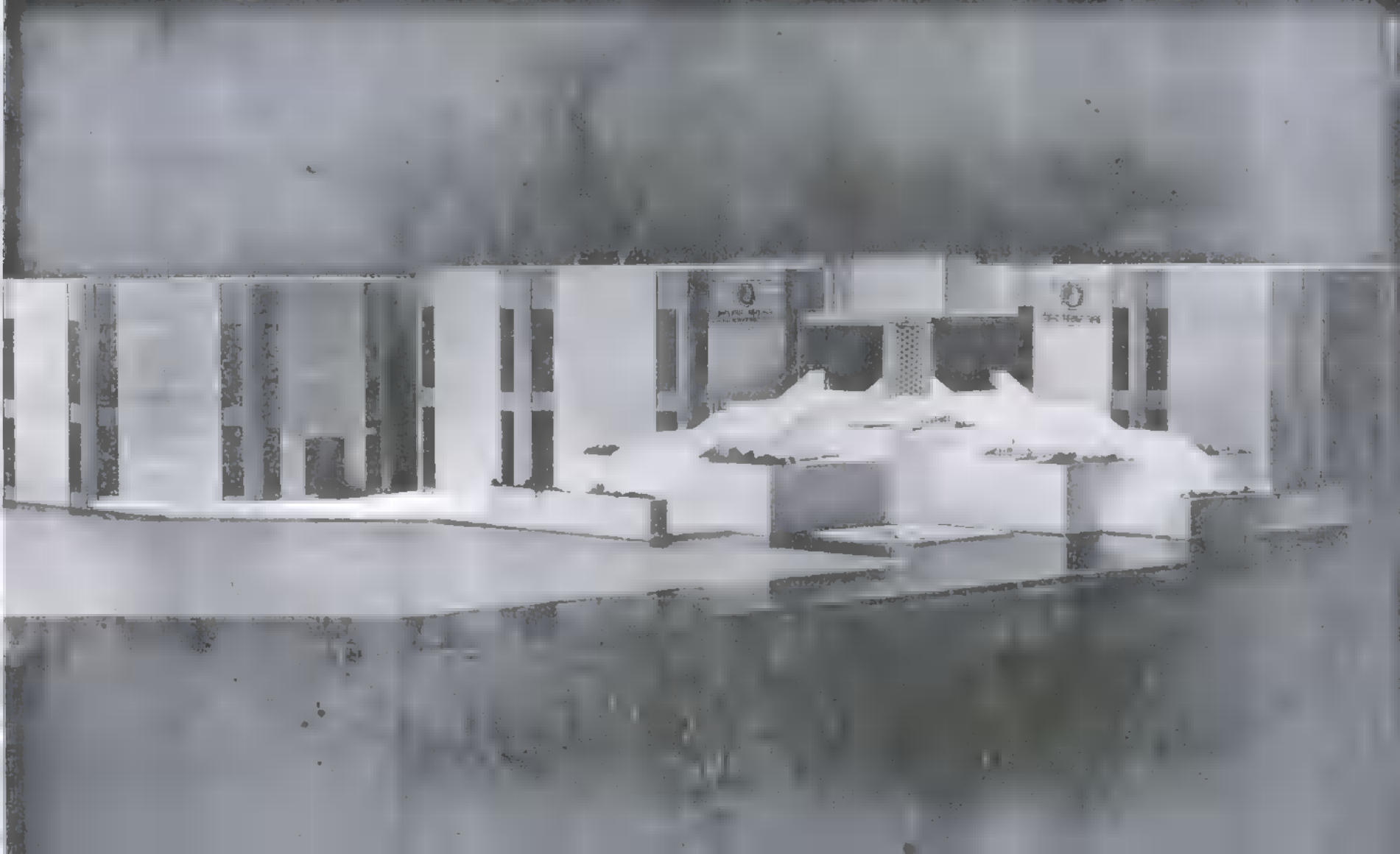
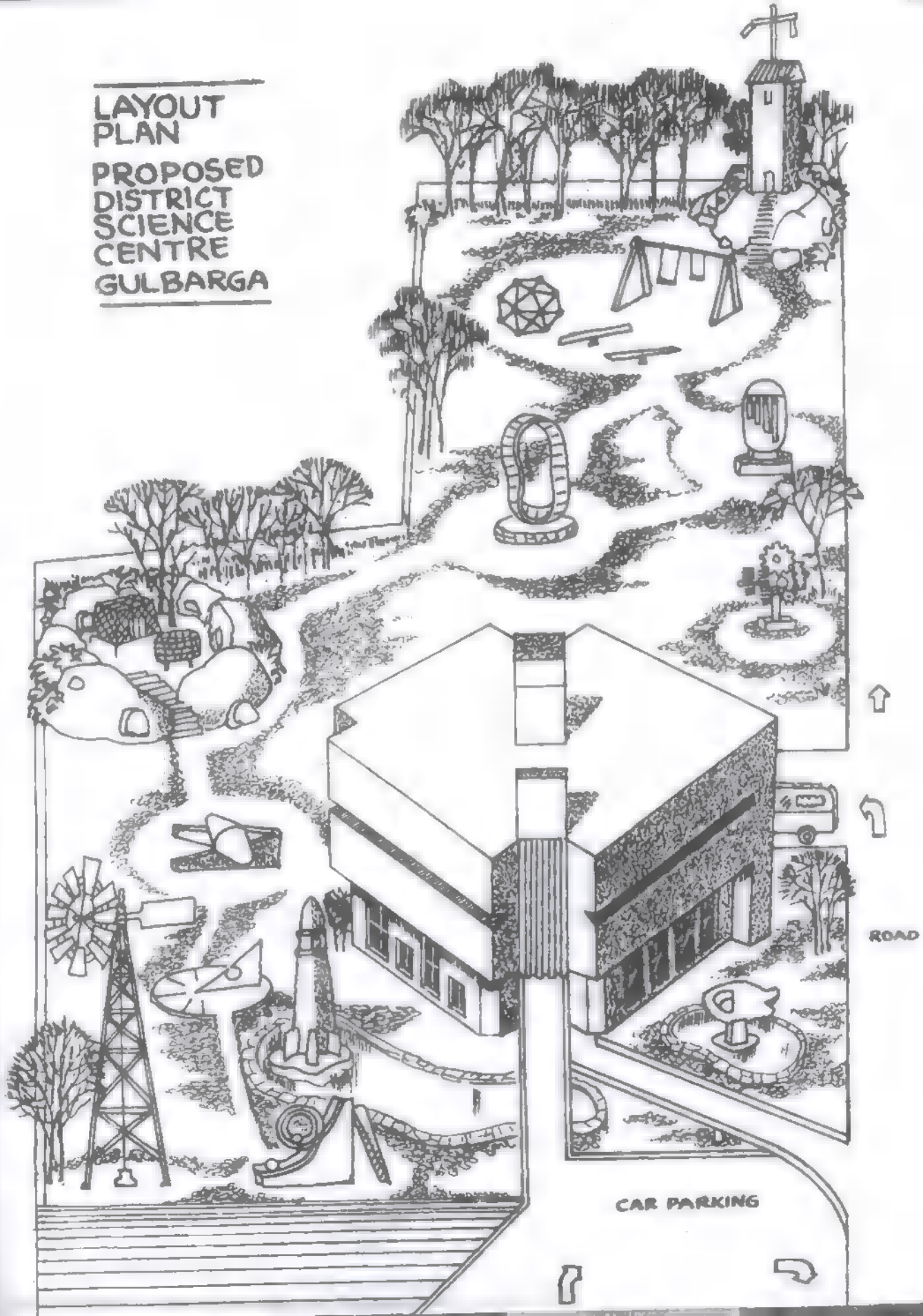
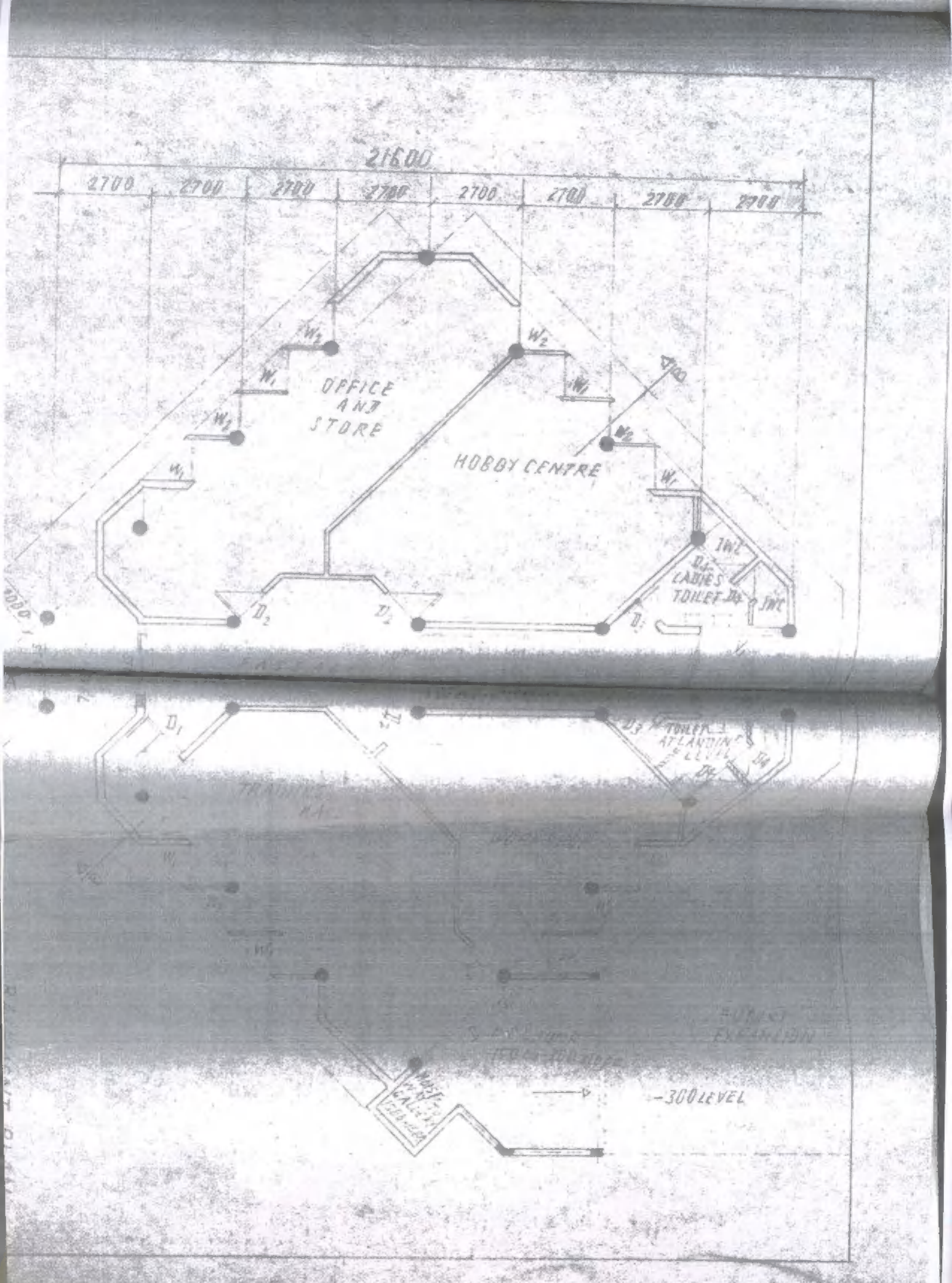
DISTRICT SCIENCE CENTRE
PURULIA, WEST BENGAL
FIRST FLOOR PLAN.



LAYOUT PLAN

PROPOSED DISTRICT SCIENCE CENTRE GULBARGA




21600
2700
2700
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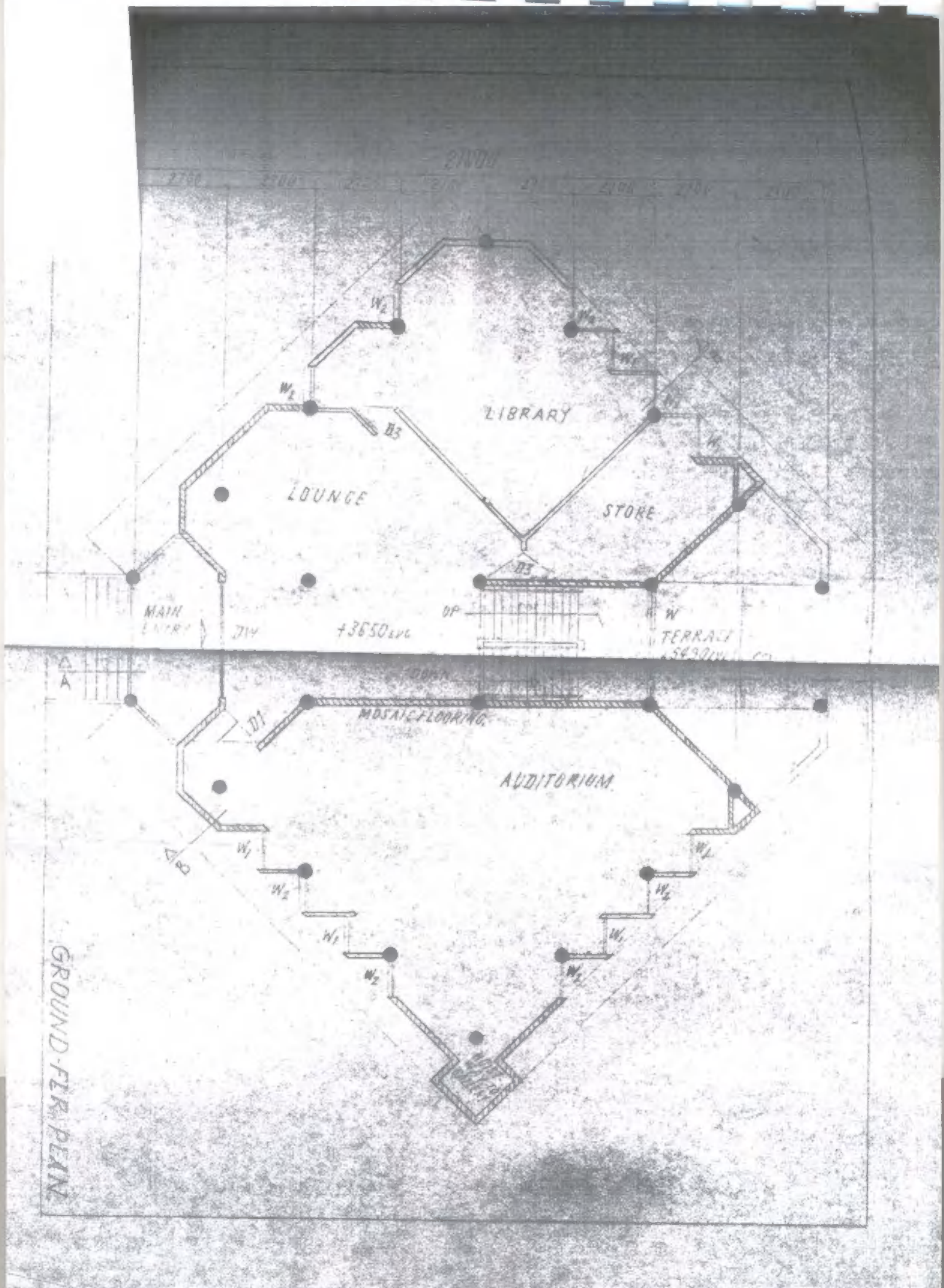
2700
OFFICE AND STORE
HOBBY CENTRE
CABLES
TOILET
-300 LEVEL


LIBRARY
LOUNGE
STORE
MAIN
+3650 LVL
TERRACE
MOSAIC FLOORING
AUDITORIUM
GROUND FLR. PLAN